... With Appropriate Regard for Community and Natural Values

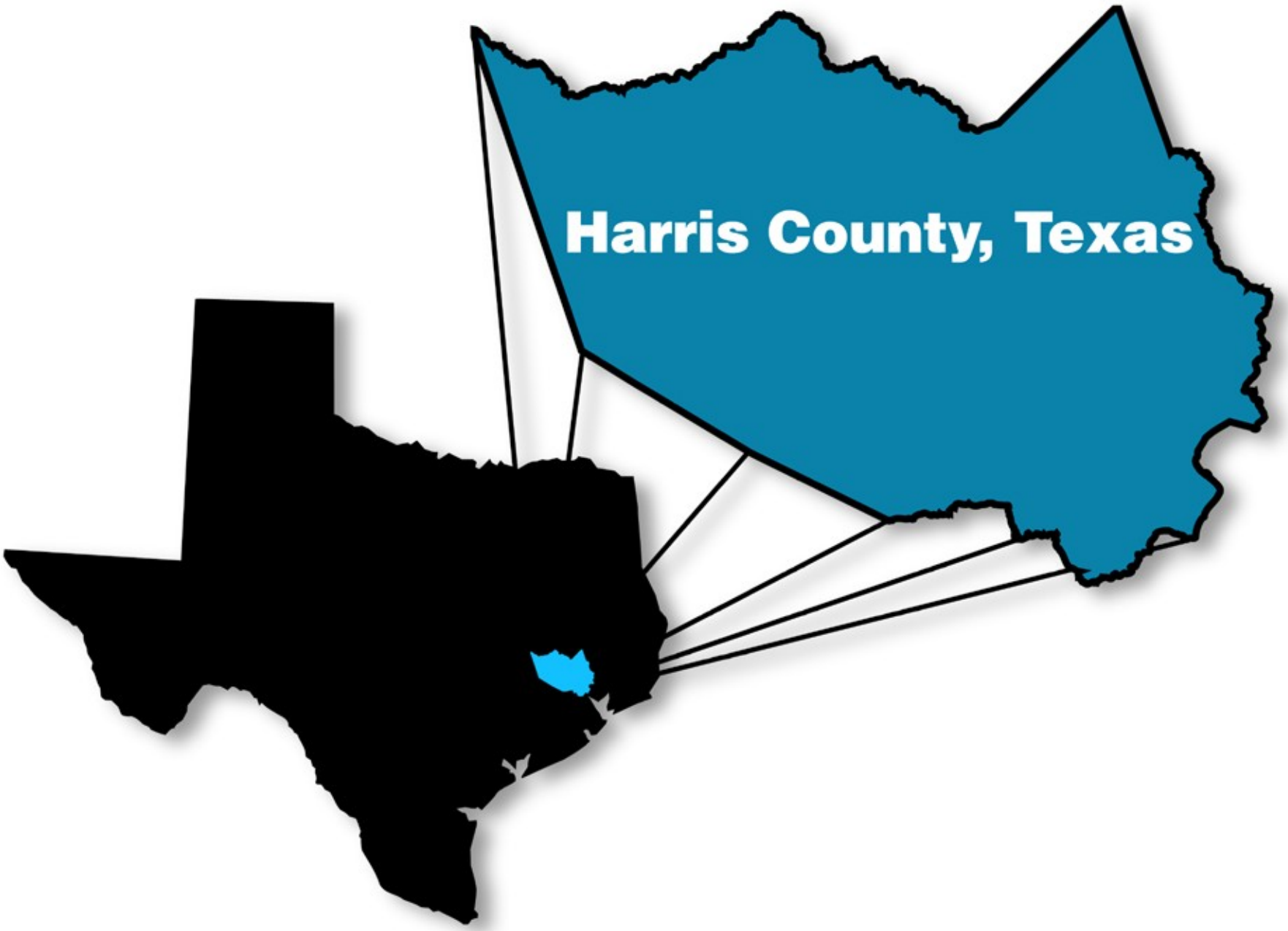
Harris County
Flood Control District

U.S. Army Corps of Engineers

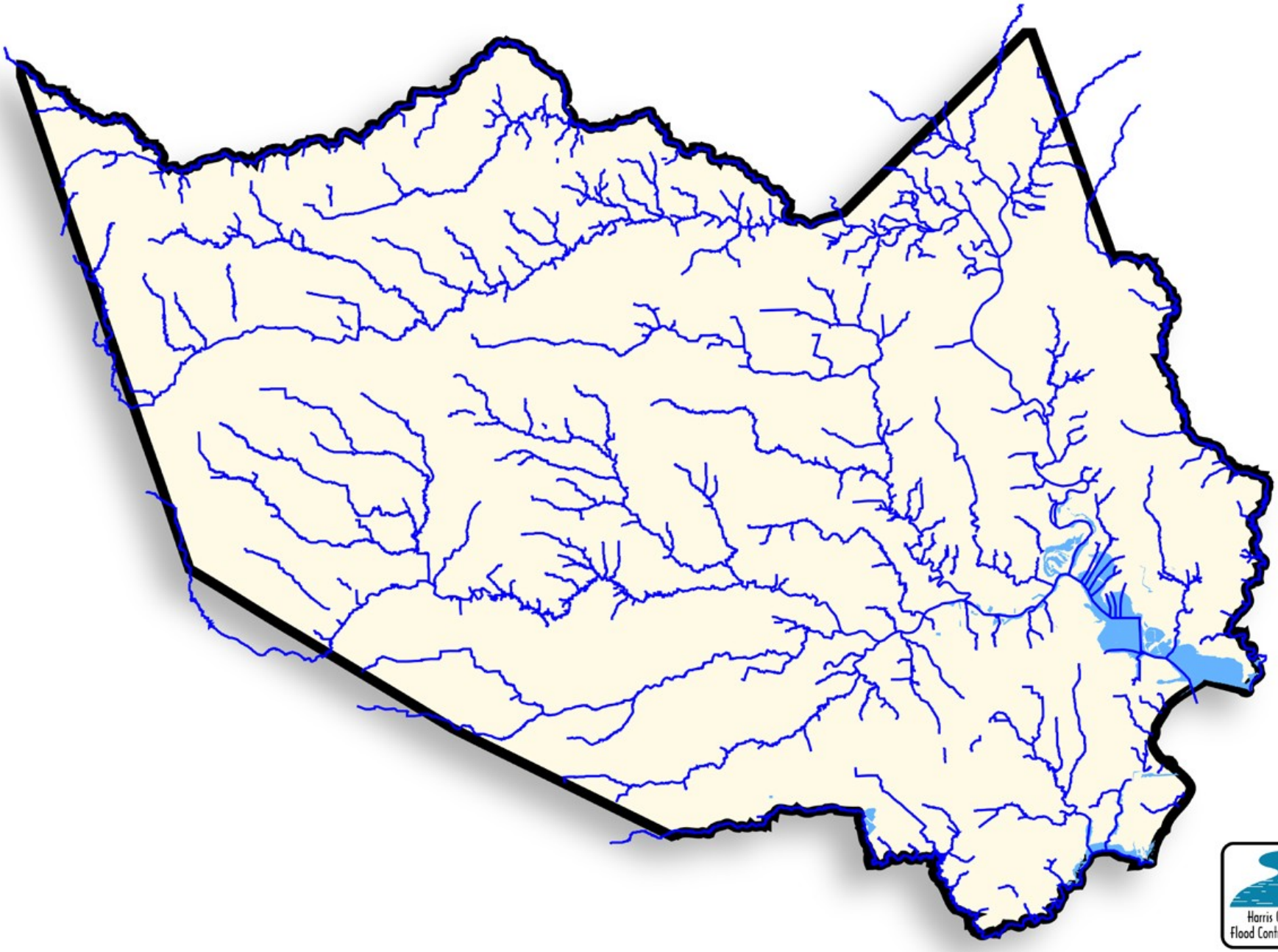
2002 Economic and Environmental Analysis Conference - New Orleans

July 17, 2002

Steve Fitzgerald
Chief Engineer
Harris County Flood Control District


Harris County, Texas

Natural Channels



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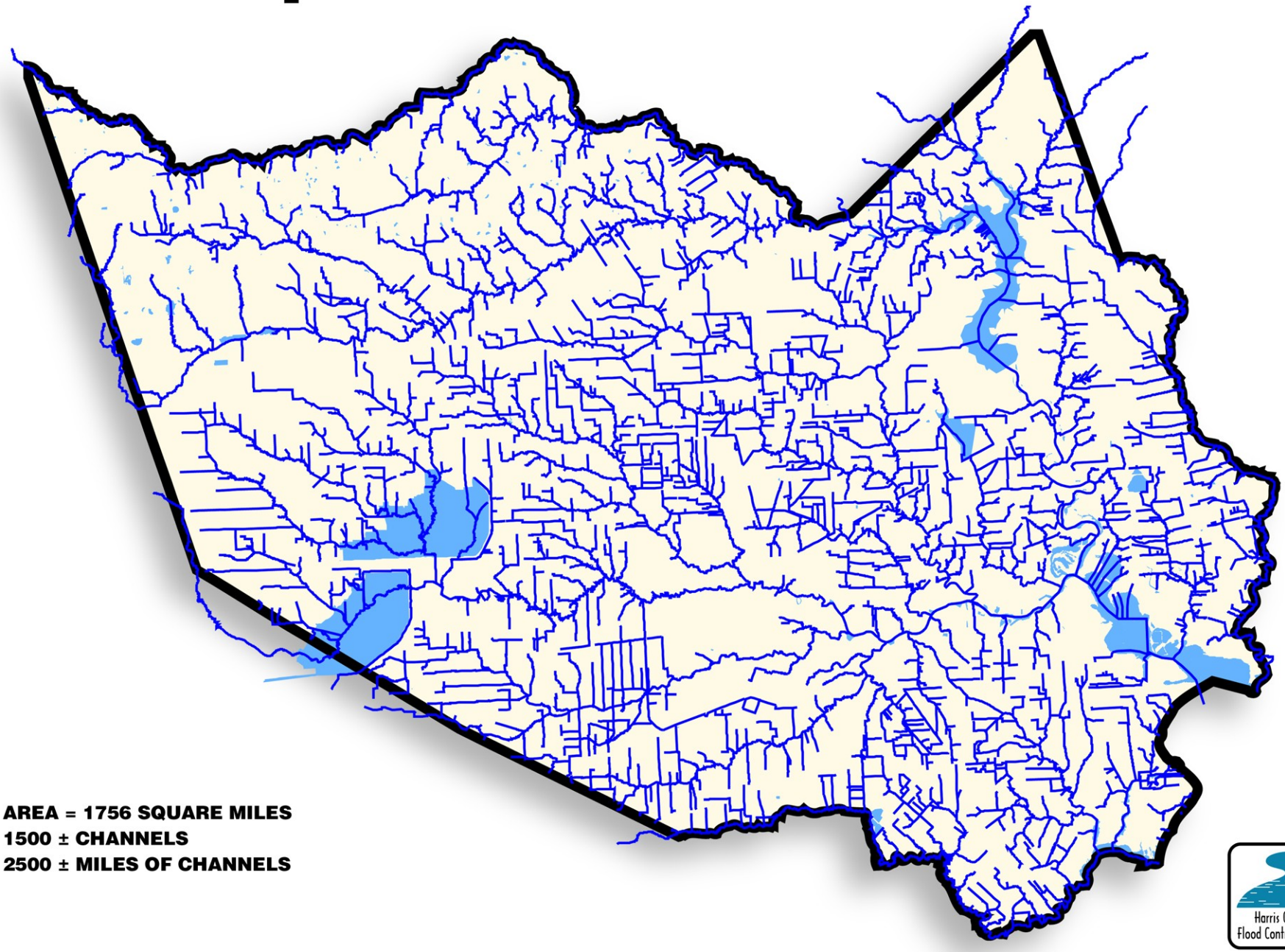
Open Channel Network



AREA = 1756 SQUARE MILES
1500 ± CHANNELS
2500 ± MILES OF CHANNELS

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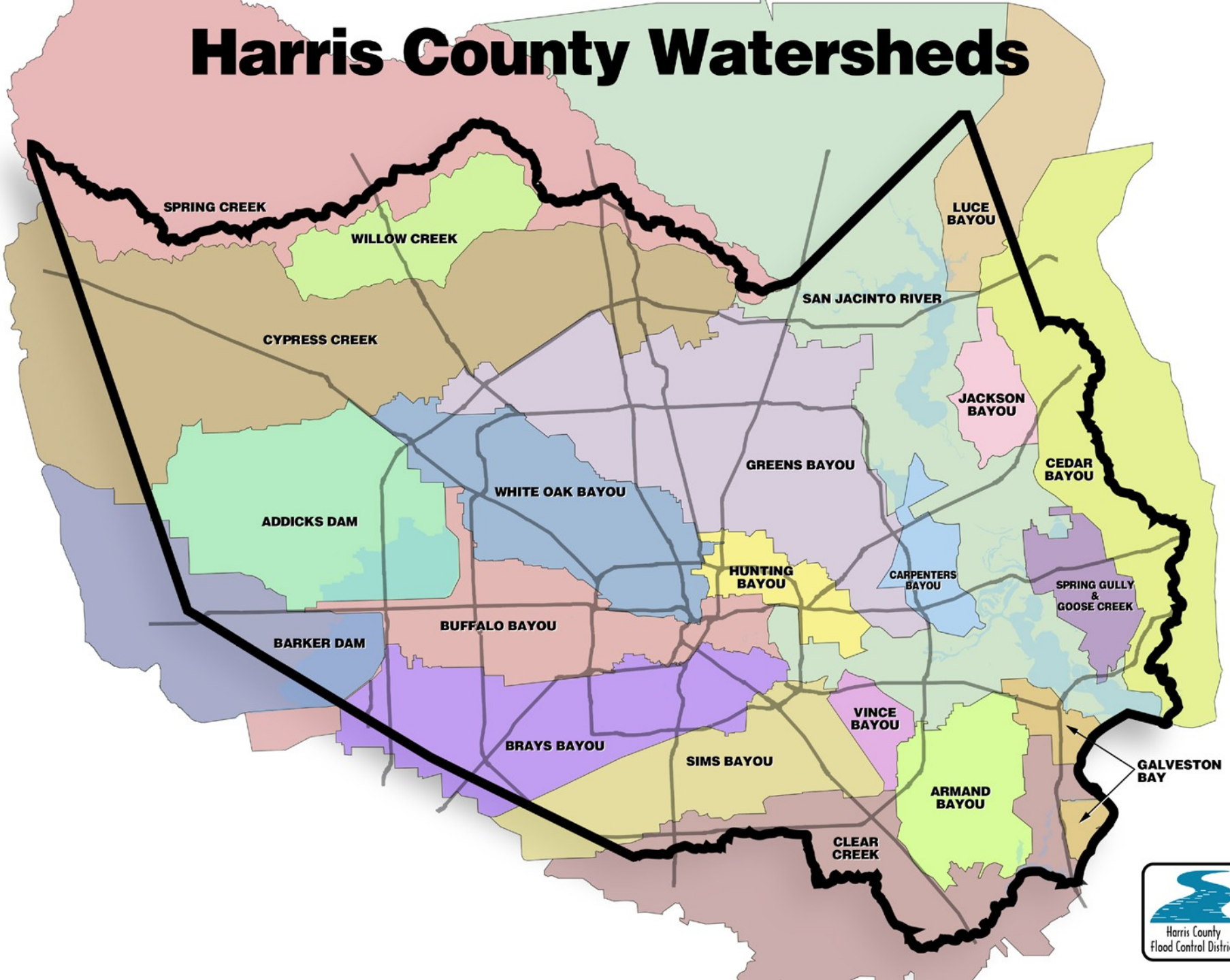
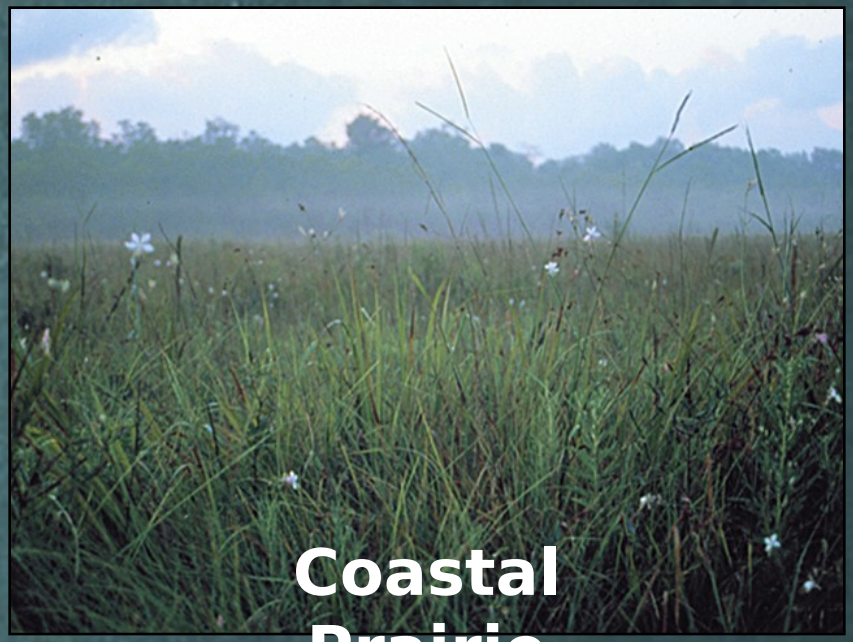
Harris County Watersheds



Environmental Setting



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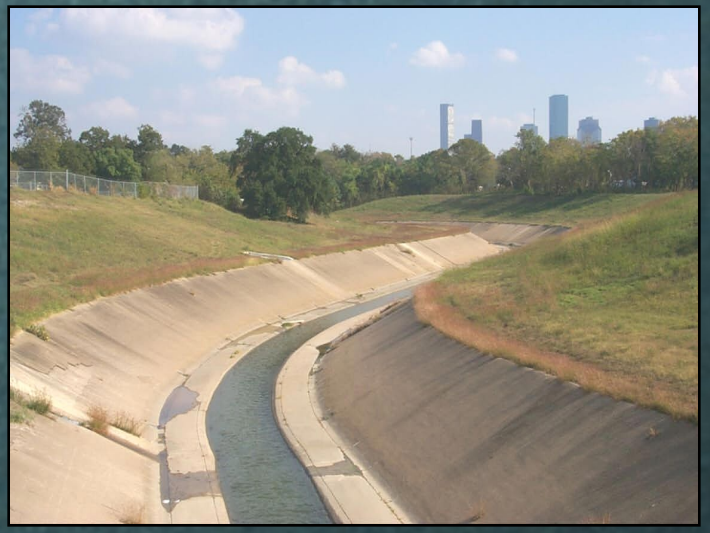
Urban Setting

Suburbs

Urban Area



1960's Style Channel

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Background

- About 2500 miles of channels
- Population about 3.4 million (32 cities)
- For 7 floods since 1989, house flooding in range of 300 - 3,200 per flood
- Almost all houses flooded more than once were built in the 1960's & 1970's

Then Tropical Storm Allison hit us hard in June 2001 . . .

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Tropical Storm Allison
June 5 – 10, 2001

Hunting Bayou, Holiday Forest, 6/9/01 am

White Oak Bayou, I-45 and I-10 Interchange, Downtown, 6/9/01 am

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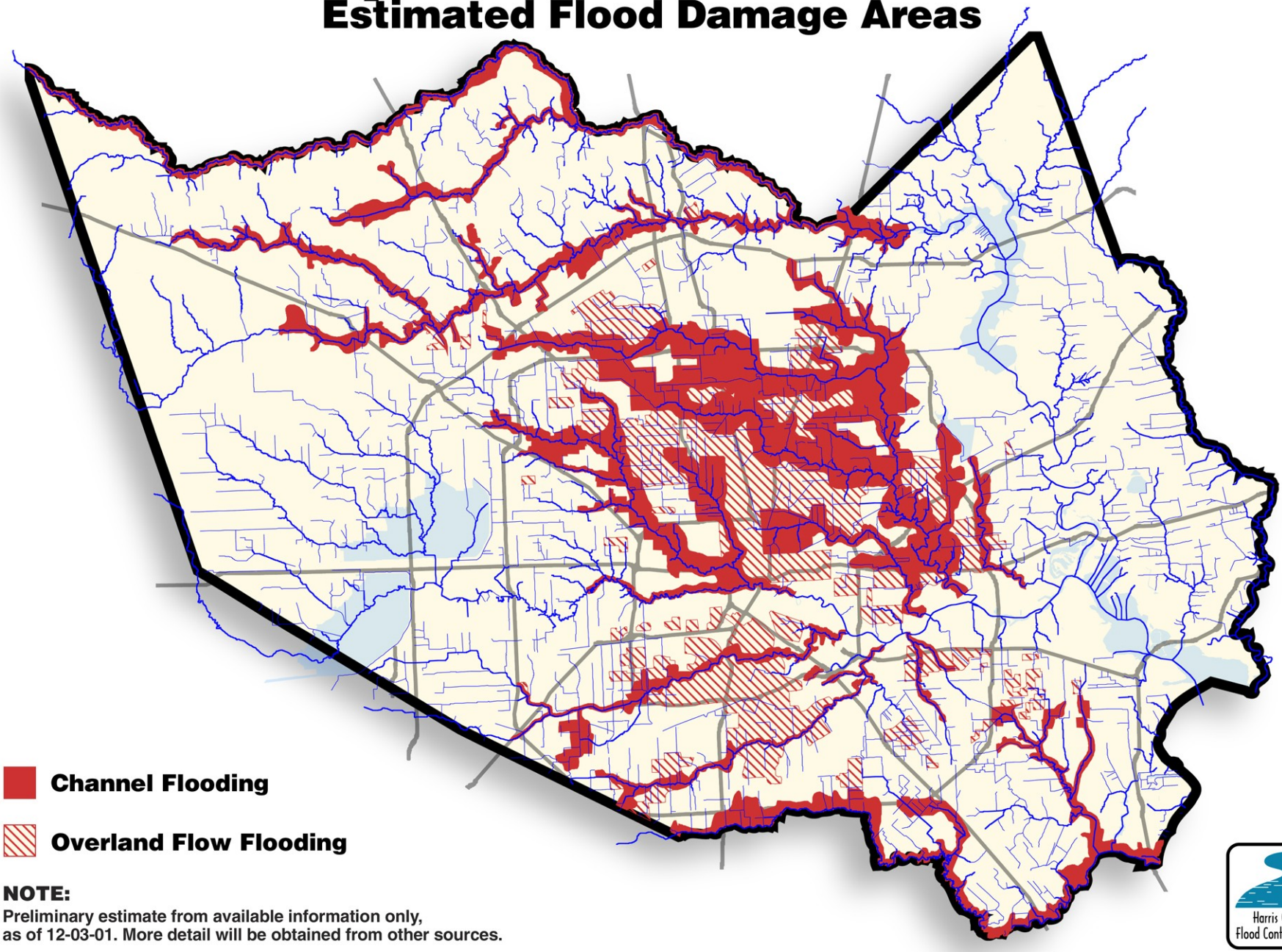
Tropical Storm Allison

Estimated Flood Damage Areas



Channel Flooding

Overland Flow Flooding

NOTE:
Preliminary estimate from available information only,
as of 12-03-01. More detail will be obtained from other sources.

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The Numbers for The Flood

- More than 2 million people *simultaneously* impacted by flooding
- Damage estimate - $5 billion
- 22 deaths
- 73,000 homes flooded
- 95,000 cars flooded

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The Partnership – Since 1937

US Army
Corps
of Engineers

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Federal Projects

- Six Completed Projects
- Six Active Projects
- We'll spend $30 million, this year
- Spend $50-$60 million in 4 years
- Typical local sponsor role until 1996

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WRDA 1996 – Section 211
"Construction of Flood Control Projects by Non-Federal Interests"

- Allows local sponsor to take the lead in planning, design, and construction.
- Corps monitors and approves work
- Cost sharing the same
- Local sponsor reimbursed the federal share

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WRDA 1996 – Section 211

- Corps rules and process

followed

- Added a new capability for the partnership
- 3 of 6 active projects – Sponsor lead

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Harris County Flood Control District's Mission Statement (1990)

To build urban flood control projects that work, with appropriate regard for community and natural values.

To reduce the risk of flood damage by:

- ***Devising the storm water management plan,***
- ***Implementing the plan, and***
- ***Maintaining the infrastructure***

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THE Challenge

How do we incorporate environmental and aesthetic features into federal flood damage reduction projects?

- **Sounds easy, but hard to do.**
  - **What does the community want?**
  - **What is the process?**
  - **How much more will it cost?**
- **Some of our experiences, so far …**

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Locally Preferred Plan

Identify Federal interest based on economics only. If ANY environmental or aesthetic quality features are added, it's a locally preferred plan.

- **There are situations where this should apply**
- **Seems to contradict the Corps of Engineers' Environmental Operating Principles**

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A Little Flexibility, Please

Either –

Allow a small deviation from the absolute NED economic plan for environmental and aesthetic quality features.

Or –

Allow a small increase in the project costs for such features, without having to include it in the economic justification.

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A Real Example

Sims Bayou – 1992

In design phase as a uniform, trapezoidal channel enlargement with grass, CCM, & concrete lining

- **Local environmental groups got involved**
- **Congressman stepped in**
- **Corps modified design**

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Results

- Modification included
  - a varying bottom width
  - flood bench with trees
  - less concrete lining
- Changes in outputs and costs < 5%
- Approved by Corps Headquarters and ASA(CW)
- People like what's been built

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SIMS BAYOU

Cellular Concrete Mat Construction in Channel Bottom

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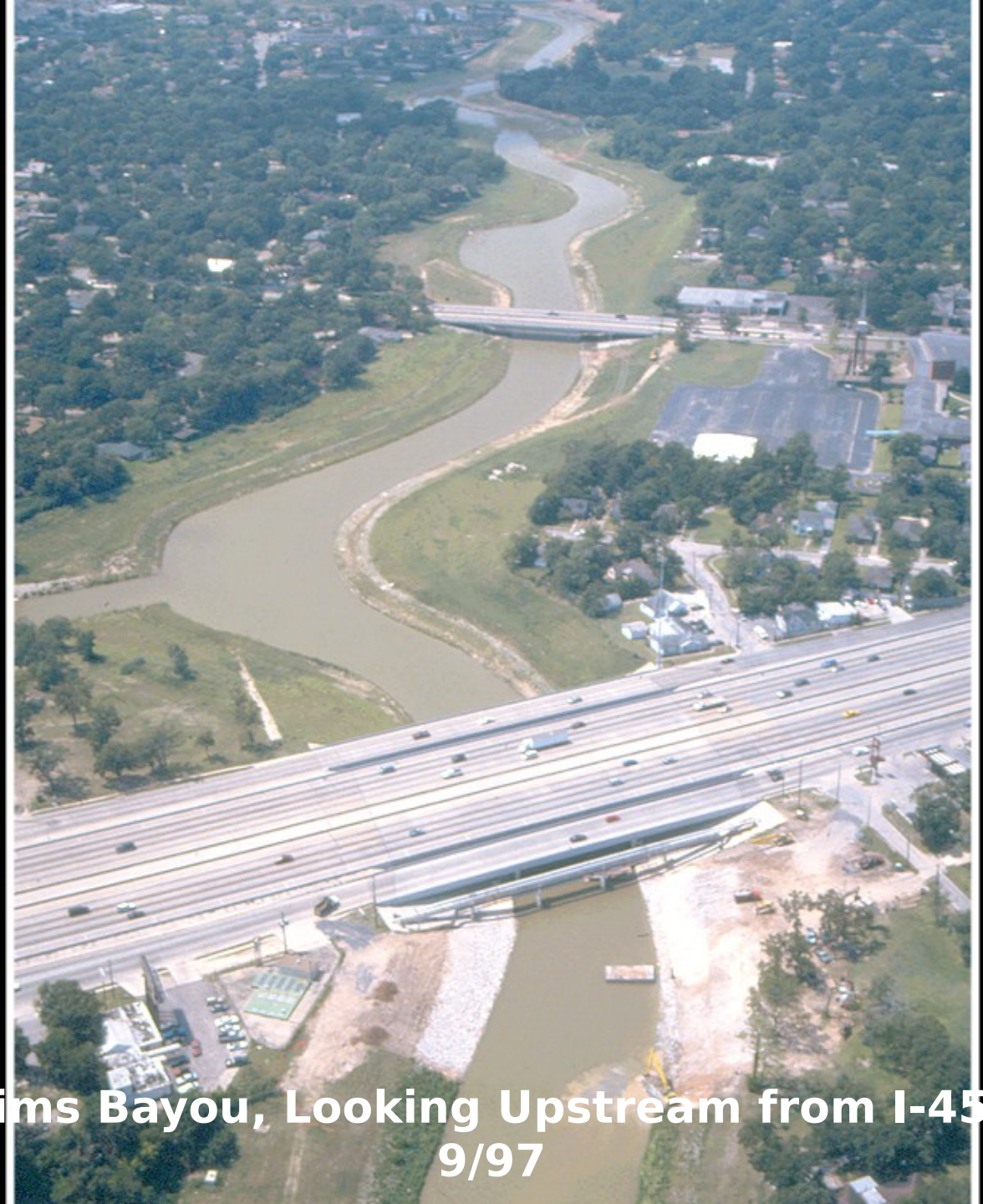

Sims Bayou, Looking Upstream from I-45, 9/97

Sims Bayou – 1998

After Construction

Sims Bayou – 2002

3 Years Later

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Swallow St. Bridge

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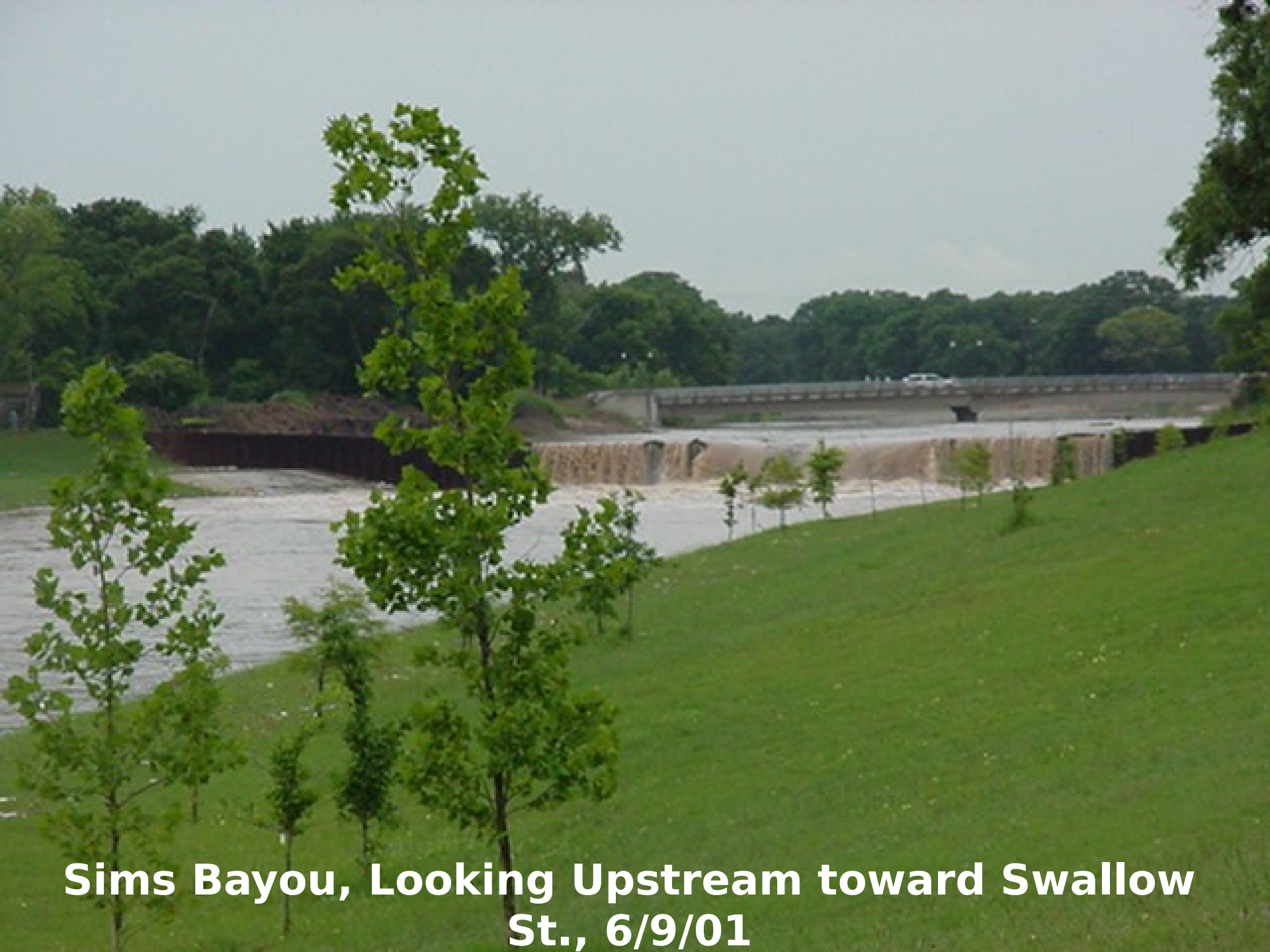
Sims Bayou, Swallow St., 6/9/01



Sims Bayou, Looking Upstream toward Swallow St., 6/9/01

Another Example

Brays Bayou – Upstream Element

- **In 1990 authorization:**

  “Tree and shrub plantings are included … to make the plan aesthetically pleasing and compatible with its suburban surroundings.”

- **Open-minded and progressive attitude in the Galveston District**

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Results

- Layout includes
  - a variable detention basin layout
  - water features
  - preservation of large trees along the old channel course
- People use the park while the detention basin is under construction

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Brays Bayou, Sam Houston Tollway Detention Basin

Aesthetic & Functional Berm Between Channel & Basin
D500-06 Compartment 1 Side Wier Looking South

Public Use During Construction

Current General Reevaluations

- Hunting Bayou
- Greens Bayou
- White Oak Bayou

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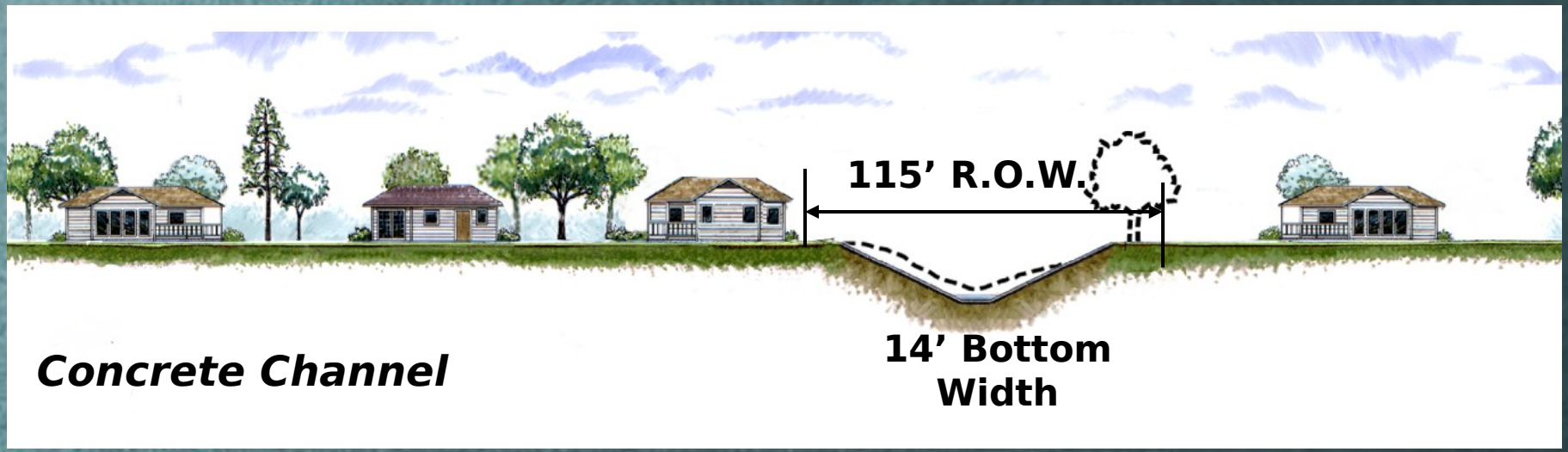
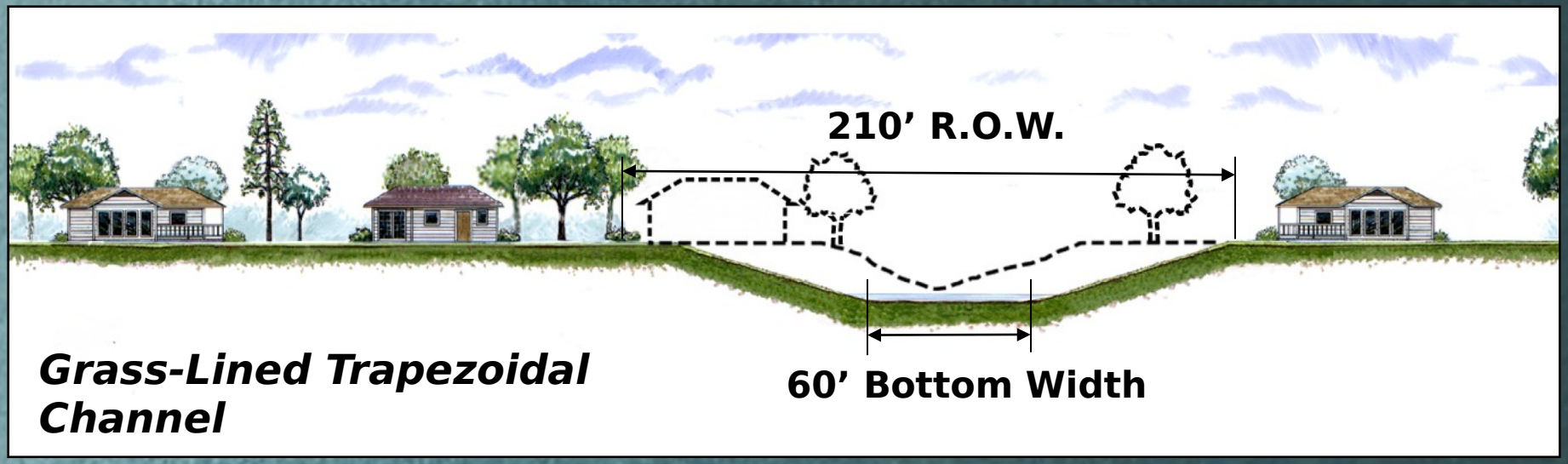
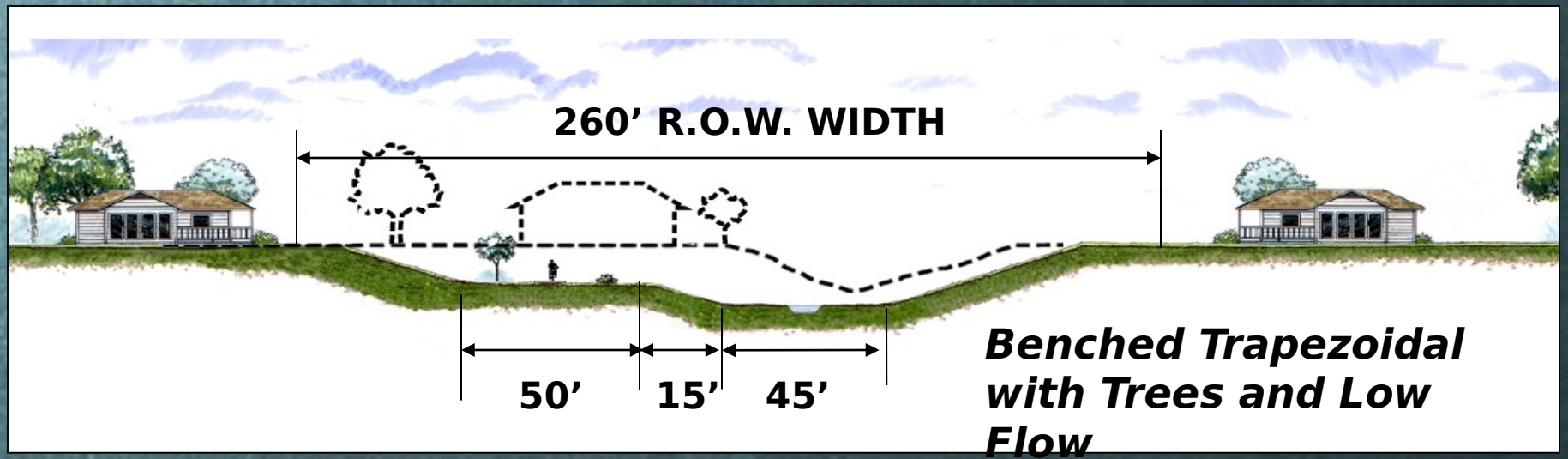
HUNTING BAYOU





Grass-Lined Trapezoidal Channel



Benched Trapezoidal with Trees and Low Flow

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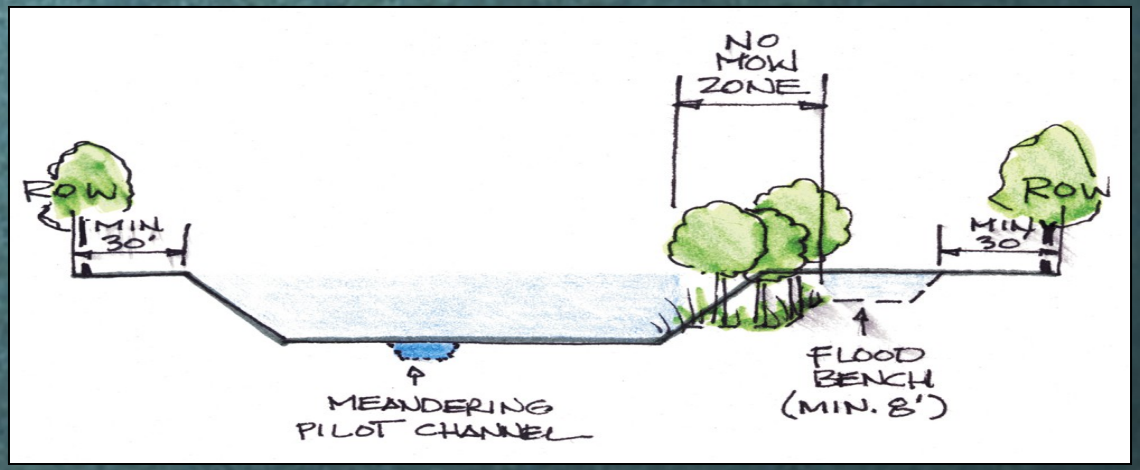
GREENS BAYOU



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WHITE OAK BAYOU

29 acre Detention Basin and Wetland Mitigation (Mid-1990's)

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WHITE OAK BAYOU

34 acre Detention Basin Tree Preservation, and Wetland Mitigation (1999)

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White Oak Bayou - Championship Park, Downtown Houston

Empowerment

"Add minimal ecosystem restoration features to NED Plan."

Ideas:

- **$ amount ≤ 5% of project cost, or**
- **fixed $ amount.**

We strongly support this initiative. It gives us "a little flexibility".

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The Partnership – Still Going Strong

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of Engineers

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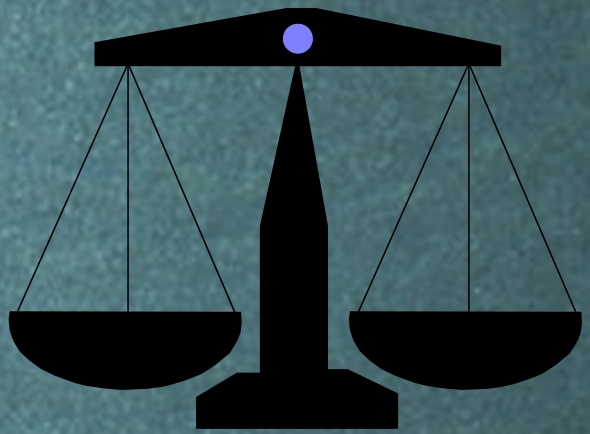
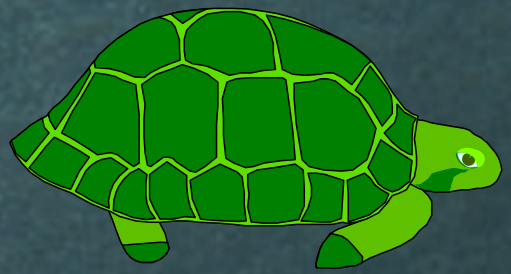
We Want To Help . . .





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It Takes A Lot Of Teamwork

US Army Corps of Engineers

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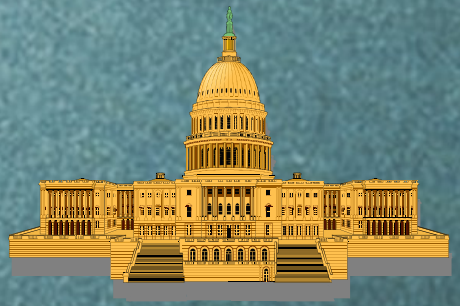

OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY

EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES
OFFICE OF MANAGEMENT AND BUDGET

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Buyout – Our Favorite Flood Damage Reduction Tool

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